## (19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 30 June 2005 (30.06.2005)

PCT

## (10) International Publication Number WO 2005/058855 A1

(51) International Patent Classification<sup>7</sup>: C07D 307/08

(21) International Application Number:

PCT/GB2004/005054

(22) International Filing Date: 1 December 2004 (01.12.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 0329152.3 16 December 2003 (16.12.2003) GB

(71) Applicant (for all designated States except US): DAVY PROCESS TECHNOLOGY LIMITED [GB/GB]; 20 Eastbourne Terrace, London W2 6LE (GB).

(72) Inventors; and

- (75) Inventors/Applicants (for US only): BACKES, Adrian, Francis [GB/GB]; 20 Eastbourne Terrace, London W2 6LE (GB). HILES, Andrew, George [GB/GB]; 20 Eastbourne Terrace, London W2 6LE (GB). SUTTON, David, Mark [GB/GB]; 20 Eastbourne Terrace, London W2 6LE (GB).
- (74) Agent: SMAGGASGALE, Gillian, Helen; W.P. Thompson & Co, 55 Drury Lane, London WC2B 5SQ (GB).

- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

## **Published:**

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

## (54) Title: PROCESS FOR THE PRODUCTION OF ETHERS

(57) Abstract: A process for the production of an ether optionally with a diol and/or a lactone, by reaction of a corresponding organic feed material selected from unsaturated dicarboxylic acids and/or anhydrides, mono-esters of unsaturated dicarboxylic acids and/or anhydrides, unsaturated lactones, and mixtures of two or more thereof in the presence of hydrogen which comprises the steps of-(a)supplying a stream comprising at least a portion of the organic feed material to a pre-reactor zone comprising catalyst and operating under reaction conditions and contacting said feed with a hydrogen containing stream such that at least some of the carbon carbon double bonds are saturated;(b)vaporising the at least partly saturated feed into the hydrogen containing stream in a vaporising zone;(c)supplying the hydrogen-containing stream containing the vaporised at least partially saturated feed to a reaction zone comprising catalyst and operating under reaction conditions; (d)recovering from the reaction zone a product stream comprising the ether and optionally diol and/or lactone; and (e)recycling depleted hydrogen-containing stream to at least the pre-reactor zone or the vaporisation zone.